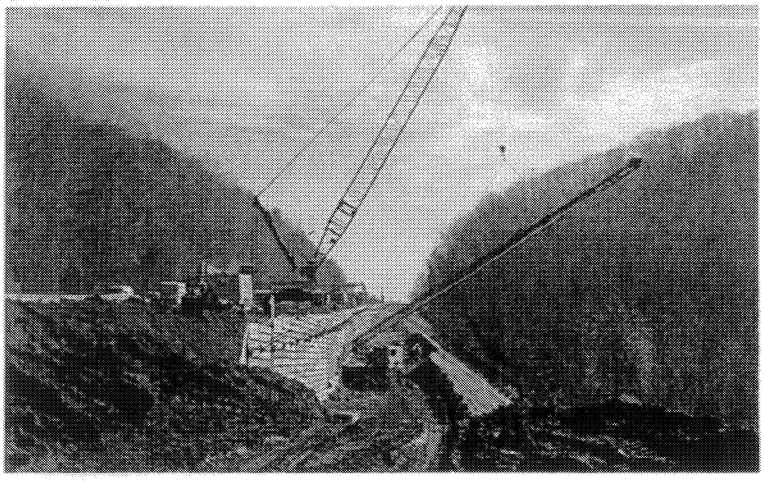
Schnabel FOUNDATION COMPANY

EARTH RETENTION SYSTEMS AND SPECIALIZED FOUNDATIONS

SOIL MIXING · SOIL NAILING · RETAINING WALLS · EXCAVATION SUPPORT · MINI-PILES

COST PROPOSAL

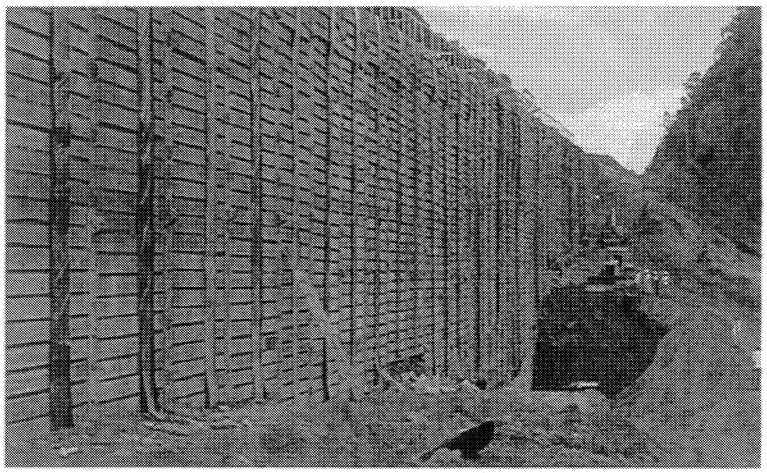


State of North Carolina
Department of Transportation

I-40 SLIDE PROJECT

C201230

HAYWOOD COUNTY, NC



Proposal Prepared For

State of North Carolina
Department of Transportation

Offer Submitted By

Schnabel Foundation Company
Southeast Regional Office
1654 Lower Roswell Road
Marietta, GA 30068
Phone (770) 971-6455
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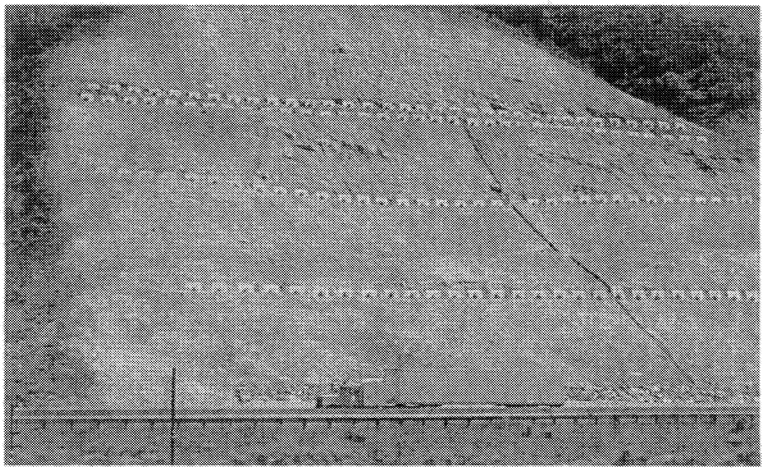

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NDATION COMPANY

COST PROPOSAL

for the proposed

ALTERNATE RETENTION SYSTEM
at
SLIDE NO. 1 AND SLIDE NO. 2
in
HAYWOOD COUNTY

Contract ID: C201320

Prepared For
the
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Prepared By:

SCHNABEL FOUNDATION COMPANY
Attn: Kevin Cargill
1654 Lower Roswell Rd.
Marietta, GA 30068
(770) 971 6455

soldier beam and then Schnabel's forces will do any hand trimming beyond the face of the beam in order to install the lagging boards (if required) and permanent reinforced shotcrete facing. Rock trimming or chipping (i.e. material that cannot be reasonably excavated using a hand shovel) is not included. Any removal of rock required to install the lagging boards shall be done by the General Contractor. Excavation will continue in maximum five (5) foot lifts until the proposed tieback bench elevation is reached.

The required bench widths for tieback installation are described within our Technical Proposal. Tieback anchor and concrete wale installation shall be allowed to progress in an uninterrupted and continuous manner. If a break occurs or additional remobilizations are required, the cost shall be paid as an addition to the bid price. During installation, necessary quantities of clean, potable water under normal city pressure shall be provided free of charge by the General Contractor to within 200 feet of the Schnabel mixing tanks.

Cost:
Schnabel Foundation Company proposes to furnish all materials and perform all labor necessary to complete the permanent tieback walls in a substantial and workmanlike manner in accordance with the **General Provisions** attached hereto for the lump sum prices provided below:

Slide No.	Lump Sum Price
1	Five Hundred and Forty Thousand $540,000
2	One Million Six Hundred and Twenty Thousand $1,620,000

The prices shown above assume that Schnabel Foundation Company performs the work on each wall in one mobilization. The prices do not stand alone and are based upon building both of the walls. These lump sum prices also include using approximately 450 CY of grout for the soldier piles and tiebacks on both walls. If additional grout is required, this additional amount will be paid as an addition to the lump sum prices noted above. The unit price for additional grout is: $ 500.00 per CY.

Remobilization and Delays:
Additional mobilizations if required. (Note: One mobilization is included in the base bid)

Soldier Beam Equipment:	$20,000	per each
Tieback Equipment	$15,000	per each

If we are delayed due to man-made obstructions or "by others," the following rates shall apply:

Soldier Beams	$300	per hour per rig
Tiebacks	$300	per hour per rig

If you have any questions or require any additional information please do not hesitate to call. We look forward to working on this very important project.

ACCEPTED:
Company _____

Signature _____

Title _____

Witness _____

Respectfully Submitted,

SCHNABEL FOUNDATION COMPANY

Kevin Cargill, P.E.
Vice President

SCHNABEL FOUNDATION COMPANY

GENERAL PROVISIONS

The **Scope of Work** and Prices detailed in this Cost Proposal are based upon all of the **GENERAL PROVISIONS** listed below:

1. **Coordination**-The General Contractor shall coordinate the project so that the work can proceed in an orderly, productive and continuous operation. The following will be provided to us free of charge: (A) Soldier Beams: excavation to the grades shown in our Technical Proposal shall be completed prior to the start of placing soldier beams; layout of the soldier beams; (B) Permanent Shotcrete: excavation to the face of the soldier beams, (C) Soil Nailing: the excavation shall be made to within one (1) inch of the back of shotcrete line; (D) Tiebacks: adequate stable benches shall be provided and maintained by the General Contractor; (A-D) Additional work required due to over excavation shall be paid as an extra to Schnabel.

Additionally, we shall be provided free of charge: Excavation in approximately five (5) foot lifts, or less if the soil will not stand open; Rock excavation so as not to undermine or otherwise damage our work; A berm around the top of the excavation to prevent overtopping of the retention system by water or debris; Safe access for our personnel, equipment and concrete trucks moving under their own power to and from each work location; Access includes furnishing, placing, and maintaining dry, level, firm benches (as specified in the Technical Proposal), and ramps with mats, gravel or other surface materials as required, throughout the project. Benches are to be slightly sloped away from any work area, in order to prevent ponding of water, and are to be wide enough for safe operation of our personnel and equipment, and as specified in the **SCOPE OF WORK**.

2. **Temporary Service**-The following will be provided to us free of charge: 110-volt, 40-amp electrical power, and water under normal city pressure, with all outlets and connections to be located within 200 feet of any work area; job toilets; watchmen services; space for a job trailer 10'x40' in size; space for fabrication and storage of material to be used in job; spot grades and elevations around the job; and see **SCOPE OF WORK** for any additional services required.

3. **Plans and Permission**-For any Schnabel Foundation Company design, a detailed plan will be furnished, signed by a licensed engineer, showing the original plan on which this price is based. Changes will be made as you request, or as necessary to obtain approval of others, but if such changes result in changed costs, the price shall be adjusted accordingly. Permission to close portions of public space will be obtained by others, as will permission to do portions of this work, including tieback or soil nail installation, on adjacent private property.

4. **Utilities**-The following shall be performed "by others" prior to commencement of our work: power lines closer than legally permissible are to be removed, sheathed or de-energized; utilities along the shoring line are to be uncovered and located, then relocated, resupported or removed, as required to prevent interference with our work.

5. **Exclusions**-This price does not include any expense or work in connection with the following: excavation; concrete (except for soldier beams, concrete wale beam, and shotcrete facing); collection and removal of debris and spoil (including shotcrete rebound) from any work location and the site; removal of: overhead or underground manmade obstructions, old footings and footing projections, backfill, tamping, restoration, line and grade work, demolition, pumping and site dewatering (including pumping rain water); treated wood; fences, stairways, barricades and handrails; traffic control and flagmen; street cleaning; protection and maintenance of slopes, benches, berms and shoring; fees, permits, deposits; liquidated and consequential damages; liability other than for our negligence, and for negligence of our subcontractors; material testing and inspections other than per our design; removal of any of our work. Subcontract terms other than those presented in this Cost Proposal. See **SCOPE OF WORK** for any additional exclusions.

6. **Change Orders**-Change orders will be in accordance with NCDOT Standard Specifications.

7. **Insurance**-We will indemnify you for damages caused by our negligence. We will maintain the following insurance: a) Worker's compensation-limits established by state law; b) Commercial General Liability in occurrence form-limits of $1.5 million (bodily injury and property damage combined per occurrence), $3 million (general aggregate), and $2 million (completed operations aggregate) including XCU hazards; c) Auto Liability-limits of $1.5 million each accident (single limit-bodily injury and property damage combined); d) Umbrella Excess Liability-limits of $1 million. Additional coverage and limits required by you, if available, will be provided at cost.

8. **Payments**-Payments shall be made in accordance with page 18 of the NCDOT Special Provisions for this project. No retainage shall be withheld.

In the event any amount due as above provided is not paid when due and we commence legal proceedings to enforce payment, you shall be liable to us for all costs of any such legal proceedings, including reasonable attorney fees based on the time expended by our attorneys.

If we are not paid within 30 days after the due dates as above provided, we may suspend work (without liability for damages resulting from such suspension) until we have been paid in full for all amounts which have not been timely paid, including amounts coming due during such suspensions, and the costs of demobilization and remobilization.

9. **Clarification to AIA Doucument A401-1997** - The following language should be added to the last sentence of Article 7.2.1 in the attached subcontract form:
"The Parties agree that to collect any damages above the unpaid balance of the Subcontract, the Contractor shall prove in a court of law or any other mutually agreed upon means of adjudication, that termination was justifiable and that the expenses to complete the work were reasonable. The Subcontractor shall be liable for the excess determined to be justifiable and reasonable and awarded by a court of law or the mutually agreed upon means of adjudication."

COST PROPOSAL

Schnabel Foundation Company (SFC) is pleased have the opportunity to construct an Alternate Retention System at Slide No. 1 and Slide No. 2 alongside I-40 between Mile Markers 3 and 4 in Haywood County, North Carolina. Since SFC has chosen to present a design and price for an alternate retention system, we have outlined the scope, site condition requirements, price of our scope of work, and terms and conditions that our price has been based upon. This price assumes that the invited General Contractors are prepared to enter into a subcontract agreement incorporating all of the attached alternate terms and conditions and subcontract language attached as part of this Cost Proposal. The subcontract that we are prepared to sign with the invited General Contractor will include the AIA Document A401-1997 entitled *Standard Form of Agreement between Contractor and Subcontractor* with this Cost Proposal and our Technical Proposal included as an Attachment. A copy of this subcontract has been included as an Attachment to this Cost Proposal. A signed contract will be required prior to mobilizing to the site.

Scope of Work

Furnish, design, and install the proposed retention system. The scope of our retention system is fully described within the Technical Proposal. The design will include design calculations, specifications, and shop drawings. A copy of our typical tieback wall specifications has been provided as an attachment to this Cost Proposal. The work is based on a design prepared by SFC which will be an alternative to that shown within the NCDOT Contract Drawings. The design will be in accordance with the requirements shown in the Geotechnical Engineering Scope of Work. Scour protection design and analysis are hereby excluded from our scope of work.

The tieback walls will consist of vertical soldier piles (pipe piles), wood lagging (in fill areas), concrete wales, and permanent tieback anchors. We will also provide drainage fabric, nelson studs and a permanent reinforced shotcrete facing. The General Contractor will be required to construct all concrete coping, barrier rails, v-gutters, drop inlets, fencing, drain pipe, and/or concrete slope paving; all of which is excluded from this Cost Proposal.

SFC will provide and install the reinforcing steel and shotcrete for the permanent facing. We will provide a screeded finish on the shotcrete face. Additional shotcrete which may be required due to excavation overbreak is excluded from this bid price. If additional shotcrete is required due to excavation overbreak, overrun quantities will be provided at $250.00 per cubic yard. The quantity of additional shotcrete will be calculated by subtracting theoretical quantities (including a 50% waste factor) from actual quantities shot (as determined by summation of quantities from batch plant receipts).

Site Conditions

The benches and temporary excavations described within our Technical Proposal shall be provided by the General Contractor. Grading will be required, by others, to ensure the bench is maintained in a firm workable condition. Backfill of the temporary excavation at Slide No. 1 shall be provided by the General Contractor in accordance the NCDOT Specifications. Any material within five (5) feet of the soldier piles shall be Class VI Select Material. We anticipate that approximately 1,500 tons of Class VI material will be required for backfilling behind the retention wall. If SFC is required to supply the Class VI material, we will do so at a price of $30.00 per ton.

This Cost Proposal is based on a continuous drilling operation. If a break occurs or additional remobilizations are required, the cost shall be paid as an addition to the bid price. Any overhead or underground obstructions (man-made) shall be removed by others prior to soldier pile or tieback installation. All traffic control, flagging, barricades, and related items are furnished by others.

After completion of the soldier beam installation, the excavation shall take place in lifts not to exceed five (5) feet (less if the soil will not stand open). The General Contractor shall be responsible for excavation to the face of the

Specification

Schnabel FOUNDATION COMPANY

Contractor Designed Tiedback Retaining Wall

Using

Soldier Beams, Lagging, Tiebacks and Concrete Facing

Distributed by
Schnabel Foundation Company
45240 Business Court, Suite 250
Sterling, Virginia 20166
(703) 742-0020

RECOMMENDED PROCEDURE FOR CONTRACTING FOR A CONTRACTOR DESIGNED TIEBACK RETAINING WALL

For the past twenty-five years, the design and installation of tiebacks to support retaining walls and other structures has been developed primarily by Tieback Retaining Wall Contractors (Contractors). Each Contractor has evolved its own equipment and methods of performing work, with many of the techniques becoming patented or proprietary. These innovative design and installation methods have produced significant cost savings for owners. In order to take advantage of the many cost saving ideas introduced by Contractors, many public agencies have used a contracting procedure that prequalifies the Contractors, and pre-approves their design in accordance with a performance Specification. This procedure has insured that qualified Contractors are allowed to use their unique methods and knowhow for any given site conditions, and as a result, owners have received the full benefit of "value engineering" instead of only part of the savings. Our experience has been that a public agency can contract for and successfully complete tieback retaining wall projects utilizing the performance specification presented herein along with the following prequalifying contracting procedure:

Prior to bidding a tieback retaining wall project, and Owner shall:

1. Pre-qualify Contractors in accordance with Section 1.2.
2. Provide to the Contractors information described in Section 1.3.
3. Require a detailed design in accordance with Section 1.4.
4. Approve the Contractors in accordance with Section 1.5.
5. Include the list of approved Contractors in the bidding documents for the project.
6. Provide a space in the Bid Schedule for the General Contractors to list the name of the "Tieback Retaining Wall Contractor" used in the bid.
7. Disqualify any Contractor from submitting a bid who has not been approved in Step *5* above.

SPECIFICATION FOR TIEBACK RETAINING WALL

1.0 DESCRIPTION

1.1 The work specified in this section consists of the design and installation of a concrete faced soldier beam, lagging, tieback retaining wall, at the locations shown on the project plans and in accordance with the requirements of these Specifications and the Tieback Retaining Wall Contractor's (Contractor's) design. The concrete facing may be CIP, structural shotcrete, precast, or a combination thereof, and is described in other sections of these Specifications.

1.2 The Contractor performing the design and construction of the work shall have a minimum of five years experience in tieback retaining walls and shall submit evidence of successful completion of at least five similar projects in subsurface conditions similar to those at this site. His staff shall include at least one registered professional engineer licensed to perform work in the State of_____. In addition, he shall have, on his staff, a supervisory engineer for the project, having at least three years of design and construction experience in tieback work, and a superintendent or foreman with a minimum of two years experience. Use of a consultant or manufacturer's representative will not meet the requirements for a staff registered engineer.

1.3 The Contractor's design shall be based on the following information furnished by the Owner.

- 1.3.1 Wall layout and location drawings, and cross-sections
- 1.3.2 New and existing utility locations
- 1.3.3 Location of Right-of-Way and easements
- 1.3.4 Owner's standard and/or special requirements for the project
- 1.3.5 Adequate soil boring and lab test data that describe the ground and water conditions at the location of the tieback wall. (See Appendix)
- 1.3.6 Level of tendon corrosion protection. If the soil pH is less than 4.5, or if the soil resistivity is less than 2,000 ohm-cm, or if sulfides are present in the ground, then encapsulated tendons should be used.

1.4 The tieback wall system shall be designed to safely support all earth pressures, any traffic or construction loads and all permanent loads without allowing undesirable deflections and settlement. Design drawings shall be prepared showing the proposed method for tieback retaining wall work, including plan, elevation and sections of the wall, and a sufficient number of details to clearly illustrate the work. The relationship of the tiebacks to right-of-way and easement lines, existing buildings, other structures, utilities, streets and other construction shall be clearly indicated. Utility locations as provided to the Contractor by the Owner shall be shown. These drawings, showing all of the above information, shall be prepared by a professional engineer registered in the State of_____who meets the qualifications described in Section 1.2, and shall bear his seal and signature.

1.5 The Owner's review will be made to verify that the Contractor is qualified to perform the work in accordance with Section 1.2, and that the design has been performed to comply with the requirements of Section 1.3 and 1.4. Review of the Contractor's plans and methods of construction by the Owner shall not be construed to relieve the

Contractor in any way of his responsibility for the successful performance of the work.

2.0 MATERIALS

2.1 Structural steel shall be in accordance with AASHTO MI 83 and ASTM A-36, or AASHTO M223 and ASTM A-572, Grade 50

2.2 Steel pipe shall be in accordance with ASTM A-S 3.

2.3 Steel tube shall be in accordance with ASTM A-500

2.4 Shear studs shall be in accordance with AASHTO M169 and ASTM A-108

2.5 Reinforcing steel shall be in accordance with ASTM A-615. No. 6 bars and smaller shall be Grade 40 (can be furnished as Grade 60), and No. 7 bars and larger shall be Grade 60.

2.6 Steel Welded Wire Fabric: The welded wire fabric shall conform to ASTM A-497 specifications.

2.7 Welding shall be in accordance with AWS DI. I Welding electrodes shall be EX7OXX. Adequacy of welds securing the tieback connections to the soldier beams shall be verified by the testing of each tieback. No other weld testing is required.

2.8 Concrete

2.8.1 Concrete for the retaining walls shall be f'_c= 3,000 psi, minimum

2.8.2 Concrete for the soldier beam drill hole shall be a one-sack sand/cement lean mix backfill, no ASTM or AASHTO designation, and no strength requirements.

2.9 Cement shall be in accordance with ASTM 150 and AASHTO M85, Type I, II or III.

2.10 Water for mixing grout shall be potable.

2.11 Admixtures which control bleed, improve flowability, reduce water content and retard set may be used in the grout. Expansive admixtures may only be added to the grout used for filling encapsulations. trumpets and anchorage covers. Expansive admixtures shall not be permitted in the bond length grout. Accelerators shall not be permitted. Admixtures, if used shall be compatible with prestressing steels and mixed in quantities not to exceed the manufacturer's recommendations.

2.12 Tieback tendons shall be fabricated from prestressing steel conforming to one of the following requirements:

2.12.1 Continuously threaded steel bars conforming to AASHTO M275-79 (ASTM A-722) "Uncoated High-strength Steel Bars for Prestressed Concrete"; or

2.12.2 Seven-wire strand conforming to the requirements of AASHTO M203-82 (ASTM A-416) "Uncoated Seven-wire Stress Relieved Strand for Prestressed Concrete."

2.13 Anchorages shall be capable of developing 95 percent of the quarantined minimum ultimate tensile strength of the prestressing steel tendon.

2.14 Prestressing steel couplers shall be capable of developing *95* percent of the guaranteed minimum ultimate tensile strength of the prestressing steel.

2.15 Spacers shall be used to separate elements of a multi-element tendon in the bond length. They shall be fabricated from plastic, steel or other materials (except wood), which is non-detrimental to the prestressing steel. A combination centralizer-spacer may be used.

2.16 Centralizers shall be fabricated from plastic, steel or materials (except wood) which are non-detrimental to the tieback tendon.

2. 17 Corrosion protection for the tieback tendons shall be in accordance with the details shown in the project plans and fabricated from the following:

2.17.1 Corrosion-inhibiting grease shall conform to the requirements of Section 3.2.5 of the PTI "Specification for Unbonded Single Strand Tendons."

2.17.2 The bondbreaker for strand tendon unbonded length shall be:

2.17.2.1 A polyethylene tube pulled or pushed over a strand. The polyethylene shall be Type II, III, or IV as defined by ASTM D=1248 (or approved equal). The tubing shall have a minimum wall thickness of 60 mils plus/minus 10 mils; or

2.17.2.2 A hot-melt extruded polypropylene tube applied over a corrosion inhibiting grease-coated strand. The polypropylene shall be cell classification PP2IO B555421 1, as defined by ASTM D-4 101 (or approved equal). The tubing shall have a minimum wall thickness of 60 mils plus/minus 10 mils.

2.17.3 The bondbreaker for bar tendon unbonded length shall be a low density polyethylene tubing, polypropylene tubing or polyvinyl chloride tubing with a minimum wall thickness of 40 mils plus/minus 10 mils.

2.17.4 Corrugated tubes shall be:

2. 17.4. 1 High density corrugated polyethylene tubing conforming to the requirement of AASHTO M252 with a minimum wall thickness of 30 mils; or

2.17.4.2 Corrugated polyvinyl chloride tubes; or

2.17.4.3 Deformed steel tubing or pipes with a minimum wall thickness of 25mils.

2.17.5 Fusion bonded, epoxy coating shall be in accordance with ASHTO M284, except that it shall have a film thickness of 15 mils.

2.17.6 Heat-shrink tubing shall be an irradiated, heat shrinkable polyethylene tube internally coated with a thixotropic sealant. Prior to shrinking the tube shall have a nominal wall thickness of 24 mils. The adhesive sealant inside the tube

shall have a nominal thickness of 20 mils.

2.17.7 A trumpet shall be used to provide a transition from the anchorage to the unbonded length corrosion protection and shall be fabricated from a steel pipe or tube. The trumpet shall have a minimum wall thickness of 0.125 inches for diameters up to four (4) inches and 0.20 inches for larger diameters.

.18 Weep drains shall be three (3) inch-diameter, schedule 40 PVC pipe. Filter fabric shall cover the opening on the soil side.

. 19 Vertical preformed permeable geocomposite drains shall be continuous and a minimum of one (1) foot wide. The drains may be placed in sections and spliced to provide continuous vertical drainage.

.20 Lagging shall be untreated, non-stress graded rough-cut lumber, No. 3 or better; or shotcrete conforming to ASTM C-94 and capable of developing 3000 psi compressive strength in 28 days.

.0 CONSTRUCTION

.1 Soldier Beam Placement

3.1.1 Soldier beams may be installed by driving with impact or vibration hammers, or set in predrilled holes and encased with lean mix backfill. Methods and equipment used for soldier beam installation shall be determined by the Contractor. For soldier beams placed in drill holes, the lean mix shall be placed by free fall from the top of the hole. Strength testing and vibration of the lean mix backfill are not required. The bottom of the drill hole may be cleaned with the auger. Bucket augers or hand cleaning of the bottom of the hole are not required. The drill shaft serves no design function and is only used to facilitate placing the soldier beam in the ground. The soldier beam may be set prior to, or after lean backfill placement at the option of the Contractor.

.2 Soldier Beam Alignment

3.2.1 The tolerance on soldier beam placement perpendicular to the wall shall be plus/minus three inches of designated location at the top, plus 2% of the vertical soldier beam length. If the soldier beam drifts into the concrete facing, then the lagging shall be set back or soil removed sufficiently to provide design wall thickness between the soldier beams, and the soldier beam shall be encased in the concrete. Along the wall, the soldier beam may be within 12 inches of location. A 15-degree twist is allowed in the front flange of the soldier beam. The top of the soldier beams shall be cut off within a tolerance of plus one inch to minus three inches of cutoff elevations specified.

3.2.2 When the soldier beam length is specified on the plans, the soldier beam tip shall be installed to within plus/minus 12 inches of the plan elevation.

3.2.3 Whenever a soldier beam deviates in location or plumbness by more than the tolerance given above, the Contractor, at his option, may provide corrective measures such as:

1) rebuilding soldier beams ; 2) redesigning soldier beam; 3) adjust soldier beam

spacing by adding additional soldier beams; 4) redesigning concrete facing; 5) building up the soldier beam section, or 6) other methods.

3.3 Soldier Beam Structural Welding and Splicing

3.3. 1 Soldier beams may be furnished in full length sections or may be spliced according to the Contractor's working drawings.

3.3.2 Any structural welding on the steel soldier beams shall be made by personnel qualified to perform the type of welding involved, in accordance with the qualification procedure of AWS DI. 1, except as amended on the plans.

3.3.3 Any field welder performing structural welding will be required to present a certificate stating that he has been qualified in accordance with the requirements of these Specifications within the previous 24-month period. A welder having a certificate which expired within the last 12 months may be permitted to commence welding provided a retest specimen is submitted immediately. The Engineer may require a confirming qualification test during the progress of the work.

3.3.4 Where shear studs are to be attached to the soldier beam flange, a four-inch-diameter area of the flange shall be cleaned of any dirt, grease, mill rust, or any other materials that might prevent proper welding of the stud to the soldier beam flange. The studs may be shot or stick-welded to the flange, at the Contractor's option.

3.4 Lagging Installation

3.4.1 The excavation shall be coordinated with the lagging installation. Vertical cuts shall not exceed six (6) feet or the short-term stand-up capability of the soil, whichever is less. Along the lagging line, the soil shall be removed to the back of lagging location, plus a tolerance of one (1) inch maximum overexcavation behind the lagging. The Contractor shall direct the excavation work so the retention system can be safely constructed.

3.4.2 If wood lagging is used, install the lagging and backfill with onsite materials, so the lagging is in contact with the soil.

3.4.3 If shotcrete is used, the surface of the ground to be shotcreted shall be scaled of loose material; weep drains and/or geocomposite drains required shall be placed; and welded wire fabric or reinforcing steel shall be secured, prior to placing shotcrete. The shotcrete shall be applied to the ground from the lower portion of the cut upwards so that rebound does not accumulate on the portion of the surface that still has to be shotcreted. The shotcrete shall not be placed on frozen ground or where there is free water. The nozzle shall be held at a distance and at angle approximately perpendicular to the face of the excavation so that rebound material will be minimal and compaction will be maximized. Curing, coring and samplings of the shotcrete is not required.

3.5 Tieback Tendon Fabrication and Corrosion Protection

3.5. 1 The tendons can be either shop or field fabricated from prestressing steel and materials conforming to the requirements of the Materials subsection of this Specification. The tendon shall be fabricated as shown on the approved Working

Drawings.

3.5.2 The Contractor shall select the type of tendon to be used. The tendon shall be sized so the design load does not exceed 60 percent of the minimum specified ultimate tensile strength of the tendon, and the maximum test load does not exceed 80 percent of the minimum specified ultimate tensile strength of the tendon.

3.5.3 Tendon Bond Length

3.5.3. 1 If grout protected tendons are appropriate, corrosion protection of the tendon bond length shall be provided by the cement grout cover. Spacers shall be used along the tendon bond length of multi-element tendons to separate each of the individual elements of the tendon so the prestressing steel will bond to the grout. Spacers shall be positioned so their center to center spacing does not exceed ten (10) feet. In addition, the upper spacer shall be located a maximum of five *(5)* feet from the top of the tendon bond length and the lower spacer shall be located a maximum of five (5) feet from the bottom of the tendon bond length.

3.5.3.2 If encapsulated tendons are appropriate, the tendon bond length portion of the tendon shall be corrosion protected by encapsulating the tendon in a grout filled corrugated plastic or deformed steel tube, or by a fusion-bonded epoxy coating. The anchorage device and bearing plate of tendons protected with fusion-bonded epoxy shall be electrically isolated from the structure. The tendon can be grouted inside the encapsulation prior to inserting the tendon in the drill hole or after the tendon has been placed in the drill hole. Expansive admixtures can be mixed with the encapsulation grout if the tendon is grouted inside the encapsulation prior to inserting it in the drill hole. The tendon shall be centralized within the tendon bond length encapsulation with a minimum of 0.10 inches of grout cover. Spacers shall be used along the tendon bond length of multi-element tendons to separate the elements of the tendon so the prestressing steel will bond to the encapsulation grout.

3.5.3.3 Centralizers shall be used to insure a minimum of 0.5 inches of grout cover over the tendon bond length. Centralizers shall be positioned so their center to center spacing does not exceed ten(10) feet. In addition, the upper centralizer shall be located a maximum of five (5) feet from the top of the tendon bond length and the lower centralizer shall be located a maximum of one (1) foot from the bottom of the tendon bond length.

3.5.3.4 Centralizers are not required on pressure-injected tiebacks if the tieback is installed in coarse-grained soils using grouting pressures greater than 150 psi.

3.5.3.5 Centralizers are not required on hollow-stem augered tiebacks if the tieback is grouted through the auger and the hole is maintained full of a stiff grout [nine (9) inch sump or less]

3.5.4 Tendon Unbonded Length

3.5.4.1 The corrosion protection of the unbonded length shall be provided by a sheath completely filled with corrosion inhibiting grease or grout, or a heat shrinkable tube internally coated with an elastic adhesive. If grease is used under the sheath, provisions shall be made to prevent the grease from escaping at the ends of the sheath. The grease shall completely coat the tendon, fill the void between the tendon and the sheath and fill the interstices between the wires of the seven-wire strands. The Working Drawings, shall show how the Contractor will provide a transition between the bond length and the unbonded length corrosion protection. If the sheath is grout filed then a separate bondbreaker must be provided. The bondbreaker shall prevent the tendon from bonding to the grout surrounding the unbonded length.

3.5.5 The trumpet shall be welded to the bearing plate. The trumpet shall have an inside diameter equal to or larger than the hole in the bearing plate. The trumpet shall be long enough to accommodate movements of the structure during testing and stressing. For strand tendons with encapsulation over the unbonded length, the trumpet shall be long enough to enable the tendon to make a transition from the diameter of the tendon in the unbonded length to the diameter of the tendon at the anchor head without damaging the encapsulation.

3.6 Storage and Handling of Tieback Tendons

3.6.1 Tendons shall be handled and stored in such a manner as to avoid damage or corrosion. Damage to the prestressing steel as a result of abrasions, cuts, nicks, welds and weld splatter will be cause for rejection. The prestressing steel shall be protected if welding is to be performed in the vicinity. Ground of welding leads to the prestressing steel is forbidden. Prestressing steel shall be protected from dirt, rust or deleterious substances. A light coating of rust on the steel is acceptable. If heavy corrosion or pitting is noted, the tendons shall be rejected.

3.6.2 The Contractor shall use care in handling and storing the tendons at the site. Prior to inserting a tendon in the drill hole, the Contractor and the Inspector shall examine the tendon for damage to the prestressing steel, the encapsulation and the bond breaker. If the encapsulation is damaged, it shall be repaired in accordance with the tendon supplier's recommendations. If the bond breaker has been damaged, it can be repaired with ultra high molecular weight polyethylene. The tape should be spirally wound around the tendon so as to completely seal the damaged area. The pitch of the spiral shall ensure a double thickness at all points.

3.7 Drilling and Grouting Tiebacks

3.7.1 Drill holes for the tiebacks at the locations indicated on the plans. Core drilling, rotary drilling, percussion drilling, auger drilling or driven casing may be used. A tolerance of plus/minus three degrees in any direction will be permitted on the tieback angle, and plus/minus 12 inches on the location at the point of entry. Tieback angles shown in the Contractor's working drawings may be changed providing the design loads are changed accordingly.

3.7.2 The tendon shall be inserted into the drill hole to the desired depth without difficulty. When the tendon cannot be completely inserted, the Contractor shall remove the tendon from the drill hole and clean or redrill the hole to permit insertion. Partially inserted tendons shall not be driven or forced into the hole.

3.7.3 The Contractor shall use a neat cement grout or a sand-cement grout. The cement shall not contain lumps or other indications of hydration. Admixtures, if used, shall be mixed in quantities not to exceed the manufacturer's recommendations. Design strength of the grout shall be a minimum of 3000 psi. However, adequacy of grout strength shall be determined by testing each tieback.

3.7.4 The grouting equipment shall produce a grout free of lumps and undispersed cement. A positive displacement grout pump shall be used. The pump shall be equipped with a pressure gauge to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least *150* psi or twice the actual grout pressures used by the Contractor, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer should be capable of continuously agitating the grout.

3.7.5 The grout shall be injected from the lowest point of the drill hole. The grout may be pumped through grout tubes, casing, hollow-stem augers or drill rods. The grout can be placed before or after insertion of the tendon. The quantity of the grout and the grout pressures shall be recorded.

3.7.6 The grout above the top of the bond length may be placed at the same time as the bond length grout, but it shall not be placed under pressure. The grout at the top of the drill hole shall not contact the back of the structure or the bottom of the trumpet before testing the tiebacks.

3.7.7 Upon completion of the grouting, the grout tube may remain in the hole, but it shall be filled with grout. After grouting, the tendon shall not be tested for a minimum of three days.

3.8 Installation of Trumpet and Anchorage:

3.8.1 The corrosion protection surrounding the unbonded length of the tendon shall extend up beyond the bottom seal of the trumpet or one (1) foot into the trumpet if no trumpet seal is provided. If the protection does not extend beyond the seal or sufficiently far enough into the trumpet, the Contractor shall extend the corrosion protection or lengthen the trumpet.

3.8.2 The corrosion protection surrounding the unbonded length of the tendon shall not contract the bearing plate or the anchor head during testing and stressing. If the protection is too long, the Contractor shall trim the corrosion protection to prevent contact.

3.8.3. The bearing plate and anchor head shall be placed so the axis of the tendon is perpendicular to the bearing plate within plus/minus three(3) degrees and the axis of the tendon shall pass through the center of the bearing plate.

3.8.4 If grout protected tendons or fusion-bonded epoxy encapsulations are used, the bearing plate, anchor-head and trumpet shall be electrically isolated from the surrounding concrete, soldier pile or any metallic element embedded i n the structure.

3.8.5 Trumpets: The most critical area to protect from corrosion is in the vicinity of the trumpet and anchorage. Trumpets shall be filled with grout after the tieback has been tested and locked-off All anchorages not encased in the concrete facing and

permanently exposed to the atmosphere shall be covered with a corrosion inhibiting grout-filled cover. The Contractor shall demonstrate that the procedures selected will produce a completely filled trumpet and a properly protected anchorage.

3.9 Tieback Testing Procedure:

3.9.1 Each tieback shall be tested. Performance tests shall be performed on three of the first10 tiebacks and five percent of the remaining tiebacks. All other tiebacks will be proof tested. No load greater than ten (10) percent of the design load can be applied to the tieback prior to testing. The maximum test load shall not exceed 80% of the minimum specified ultimate tensile strength of the tendon. The test load shall be simultaneously applied to the entire tendon. Stressing of single elements of multi-element tendons shall not be permitted.

3.9.2 Testing Equipment

3.9.2.1 A dial gauge or vernier scale capable of measuring to 0.001 inches shall be used to measure tieback movement. The movement-measuring device shall have a minimum travel equal to the theoretical elastic elongation of the total tieback length at the maximum test load and it shall have adequate travel so the tieback movement can be measured without resetting the device.

3.9.2.2 A hydraulic jack and pump shall be used to apply the test load. The jack and a calibrated pressure gauge shall be used to measure the applied load. The jack and pressure gauge shall be calibrated by an independent firm as a unit. The calibration shall have been performed within forty-five (45) working days of the date submitted. The pressure gauge shall be graduated in 100-psi increments or less. The rain travel of the jack shall not be less than the theoretical elastic elongation of the total tieback length at the maximum test load.

3.9.2.3 A calibrated reference pressure gauge shall also be kept at the site. The reference gauge shall be calibrated with the test jack and pressure gauge.

3.9.2.4 The stressing equipment shall be placed over the tieback tendon in such a manner that the jack, bearing plates, and stressing anchorage are axially aligned with the tendon and the tendon is centered with the equipment.

3.9.3 Loading of Tiebacks

3.9.3.1 Loading

The performance or proof test shall be made by incrementally loading and unloading the tieback in accordance with the Loading Schedule. The load shall be raised from one increment to another immediately after recording the tieback movement. The tieback movement shall be measured and recorded to the nearest 0.00 1 inches with respect to an independent fixed reference point at the alignment load and at each increment of load. The load shall be monitored with a pressure gauge.

The reference pressure gauge shall be placed in series with the pressure gauge during each performance test. If the load determined by the reference pressure gauge and the load determined by the pressure gauge differ by more than ten (10) percent, the jack, pressure gauge and reference pressure gauge shall be recalibrated at no expense to the Owner. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.

3.9.3.2Load Hold:

The maximum test load shall be held for ten (10) minutes. The jack shall be re-pumped as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied and the tieback movement, with respect to a fixed reference, shall be measured and recorded at 1 minute, 2,3,4,5,6, and 10 minutes. If the tieback movement between one (1) minute and ten (10) minutes exceed 0.04 inches, the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the tieback movement shall be recorded at 15 minutes, 20, 25, 30, 45, and 60 minutes.

3.9.3.3 Loading Schedule

PERFORMANCE TEST SCHEDULE		PROOF TEST SCHEDULE
AL	AL	AL
0.25 DL	0.25 DL	0.25 DL
AL	0.50 DL	0.50 DL
0.25 DL	0.75 DL	0.75 DL
0.50 DL	1.00 DL	1.00 DL
AL	1.20 DL	1.20 DL Max. Test Load
0.25 DL	AL	Reduce to Lock Off Load
0.50 DL	0.25 DL	
0.75 DL	0.50 DL	
AL	0.75 DL	
0.25 DL	1.00 DL	
0.50 DL	1.20 DL	
0.75 DL	1.33 DL Maximum Test Load	
1.00 DL	Reduce to Lock-Off Load	

(The lock-off load shall be 0.75 DL unless otherwise shown on the Contract Drawings)

Where: AL - is the alignment Load
DL - is the tieback design load

3.9.3.4 Tieback Test Acceptance Criteria: A performance or proof tested tieback is acceptable if:

1. The total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length; and
2. For a 10 minute load hold the tieback carries the maximum test load with .04" or less of movement between one and 10 minutes; or
3. For a 60 minute load hold the tieback carries the maximum test load with .08" or less of movement between six and 60 minutes.

3.9.3.5 If the total movement of a tieback at the maximum test load does not exceed 80 percent of the theoretical elastic elongation of the unbonded length, the Contractor shall replace the tieback at no additional cost to the Owner.

3.9.3.6 Any tieback which cannot be successfully tested to the loads required in this Specification can only be incorporated in the wall using one-half of the load which it will hold without continuous movement. Additional tiebacks will be installed for the difference between the design load and the reduced capacity of the first tieback.

3.9.3.7 When a tieback fails, the Contractor may modify the design and/or the construction procedures. These modifications

may include, but are not limited to installing additional tiebacks, reducing the tieback design load by increasing the number of tiebacks, modifying the installation methods, increasing the anchor length or changing the tieback type. Any modification of design or construction procedures shall be at no change in the contract price.

3.9.3.8 Retesting of the tieback shall not be allowed

.10 Measurement and Payment:

3.10.1 The quantity for "Mobilization" for a tieback wall shall be measured for payment on a per "each" basis. All design costs are to be included in this unit. The quantity of "Tieback Retaining Wall" shall be measured for payment on a "lump-sum" basis.

3.10.2 The accepted quantity of "Mobilization" will be paid for at the unit price bid per Each. This payment shall be considered to be full compensation for all work connected with providing the design and mobilizing to install the tieback retaining walls.

3.10.3 The accepted quantity of Tiedback Retaining Wall will be paid for at the unit price bid per "Lump Sum". Progress payments shall be made on additional breakdowns based upon material delivered to the site and percentage of work completed.

PAY ITEM	PAY UNIT
Mobilization	Each
Tieback Retaining Wall	Each

APPENDIX

SUBSURFACE EXPLORATION AND TESTING PROGRAMS

As a minimum, the subsurface exploration and testing programs shall define the following, where applicable:

- Soil strata
  -Depth, thickness and variability
  -Identification and classification
  -Relevant engineering characteristics (i.e., natural moisture content, unit weight, Atterberg limits, shear strength, compressibility, stiffness, permeability, expansion or collapse potential, and frost susceptibility)
- Rock strata
  -Depth to rock
  -Identification and classification
  -Quantity (i.e., soundness, hardness, jointing and presence of joint tilling, resistance to weathering, if exposed, and solutioning)
  -Compressive strength (e.g., uniaxial compression, point load index)
  -Expansion potential
- Ground water elevation, chemical composition and ph
- Ground surface topography
- Local conditions requiring special consideration (e.g., presence of stray electrical currents).
- Relevant soil and rock chemistry, including ph, resistivity and sulfide content.

Exploration logs shall include soil and rock strata descriptions, penetration resistance for soils (e.g., SPT or q_c), and sample recovery and RQD for rock strata. The drilling equipment and method, use of drilling mud, type of SPT hammer (i.e., safety, donut, hydraulic) or cone penetrometer (i.e., mechanical or electrical), and any unusual subsurface conditions such as artesian pressures, boulders or other obstructions, or voids shall also be noted on the exploration logs.

A minimum of one soil boring shall be made for each retaining wall. For retaining walls over 100 feet in length, the spacing between borings should be no greater than 100 feet. In planning the exploration program, consideration should be given to placing borings inboard and outboard of the wall line to define conditions at the toe of the wall and in the zone behind the wall where the tiebacks will be made so that anchorage capacities can be estimated.

Testing shall be performed as necessary to determine engineering characteristics including unit weight, natural moisture content, Atterberg limits, shear strength, compressive strength and compressibility. In the absence of laboratory testing, engineering characteristics may be estimated based on published test results or local experience.

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AIA DOCUMENT A401-1997

Standard Form of Agreement Between Contractor and Subcontractor

GENERAL INFORMATION

PURPOSE. AIA Document A401-1997 is intended for use in establishing the contractual relationship between the Contractor and Subcontractor. This document, when completed, will adopt by reference AIA Document A201 and a pre-existing Prime Contract between the Contractor and Owner. The completed A401-1997 document will thus form an Agreement whereby the duties and responsibilities of the Contractor under the Prime Contract pass to the Subcontractor with respect to a portion of the work designated in the completed A401-1997 document.

RELATED DOCUMENTS. This document has been prepared for use with a Prime Contract which may be based upon the latest editions of one or more of the AIA A-Series documents, especially those that relate to and adopt AIA Document A201, General Conditions of the Contract for Construction. If another general conditions will be used, A401-1997 will have to be modified to refer to that general conditions instead of to AIA Document A201.

DISPUTE RESOLUTION—MEDIATION AND ARBITRATION. This document contains provisions for mediation and arbitration of claims and disputes. Mediation is a non-binding process, but is mandatory under the terms of this agreement. Arbitration is mandatory under the terms of this agreement and binding in most states and under the Federal Arbitration Act. In a minority of states, arbitration provisions relating to future disputes are not enforceable but the parties may agree to arbitrate after the dispute arises. Even in those states, under certain circumstances (for example, in a transaction involving interstate commerce), arbitration provisions may be enforceable under the Federal Arbitration Act.

The AIA does not administer dispute resolution processes. To submit disputes to mediation or arbitration or to obtain copies of the applicable mediation or arbitration rules, write to the American Arbitration Association or call (800) 778-7879. The American Arbitration Association may also be contacted at *http://www.adr.org*.

WHY USE AIA CONTRACT DOCUMENTS? AIA contract documents are the product of a consensus-building process aimed at balancing the interests of all parties on the construction project. The documents reflect actual industry practices, not theory. They are state-of-the-art legal documents, regularly revised to keep up with changes in law and the industry—yet they are written, as far as possible, in everyday language. Finally, AIA contract documents are flexible: they are intended to be modified to fit individual projects, but in such a way that modifications are easily distinguished from the original, printed language.

For further information on AIA's approach to drafting contract documents, see AIA Document M120, Document Drafting Principles.

USE OF NON-AIA FORMS. If a combination of AIA documents and non-AIA documents is to be used, particular care must be taken to achieve consistency of language and intent among documents.

LETTER FORMS OF AGREEMENT. Letter forms of agreement are generally discouraged by the AIA, as is the performance of a part or the whole of the Work on the basis of oral agreements or understandings. The standard AIA agreement forms have been developed through more than 100 years of experience and have been tested repeatedly in the courts. In addition, the standard forms have been carefully coordinated with other AIA documents.

STANDARD FORMS. Most AIA documents published since 1906 have contained in their titles the words "Standard Form." The term "standard" is not meant to imply that a uniform set of contractual requirements is mandatory for AIA members or others in the construction industry. Rather, the AIA standard documents are intended to be used as fair and balanced baselines from which the parties can negotiate their bargains. As such, the documents have won general acceptance within the construction industry and have been uniformly interpreted by the courts. Within an industry

spanning 50 states—each free to adopt different, and perhaps contradictory, laws affecting that industry—AIA documents form the basis for a generally consistent body of construction law.

USE OF CURRENT DOCUMENTS. Prior to using any AIA document, the user should consult an AIA component chapter or a current AIA Documents Price List to determine the current edition of each document.

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CHANGES FROM THE PREVIOUS EDITION

A401-1997 revises the 1987 edition of A401 to reflect changes made in AIA Document A201-1997. It incorporates alterations proposed by subcontractors, architects and other interested parties. The following are some of the significant changes made to the contents from the 1987 edition of A401.

ARTICLE 1: A new paragraph has been added adopting A201 by a specific reference. It is also provided that the Subcontract may be amended only by a written Modification.

ARTICLE 3: The Contractor is now required to furnish information to enable the Subcontractor to enforce mechanic's lien rights. If the Contractor makes or defends a claim against the Owner relating to the Subcontractor's Work, the Contractor must make information relating to that claim available to the Subcontractor. Time limits and information requirements are prescribed for Contractor's claims for services and materials provided to the Subcontractor.

ARTICLE 4: The Contractor has the explicit authority to reject Work of the Subcontractor. Hazardous materials provisions have been expanded to cover materials other than asbestos and PCB, and indemnification of the Subcontractor under these provisions has been broadened.

ARTICLE 6: Mediation is added as a precursor to arbitration.

ARTICLE 7: The Contractor is now permitted to terminate the Subcontract for convenience. Procedures and rights of the Subcontractor are set out for situations in which the Prime Contract is terminated for the convenience of the Owner.

ARTICLE 9: It is explicitly noted that time is of the essence of the Subcontract with respect to the obligations of both the Contractor and Subcontractor.

ARTICLE 11: In the absence of a payment bond in the full amount of the Contract Sum, payments received by the Contractor for the Subcontractor's Work are held by the Contractor for the Subcontractor. Written notice is required if the Contractor disapproves the Subcontractor's application for payment.

ARTICLE 13: On request of the Subcontractor, the Contractor is required to provide copies of property and equipment policies. To the extent required property insurance is not in effect for the full value of the Subcontractor's Work, the Subcontractor may purchase such insurance and be reimbursed by the Contractor.

ARTICLE 15: The Contractor and Subcontractor waive consequential damages (i.e., indirect damages) arising out of the Subcontract.

USING THE A401 FORM

MODIFICATIONS. Users are encouraged to consult with an attorney before completing an AIA document. Particularly with respect to contractor's licensing laws, duties imposed by building codes, interest charges, arbitration and indemnification, this document may require modification with the assistance of legal counsel to fully comply with state or local laws regulating these matters.

Generally, necessary modifications may be accomplished by writing or typing the appropriate terms in the blank spaces provided on the form or by special conditions or amendments adopted by reference. The form may also be modified by striking out language directly on the original printed form. Care must be taken in making these kinds of deletions, however. Under NO circumstances should printed language be struck out in such a way as to render it illegible (as, for example, with blocking tape, correction fluid or X's that completely obscure the text). This may raise suspicions of concealment or suggest that the completed and signed document has been tampered with. Handwritten changes should be initialed by both parties to the contract.

It is definitely not recommended practice to retype the standard document. Besides being outside the limited license for reproduction granted under these Instructions, retyping can introduce typographical errors and cloud the legal

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AIA DOCUMENT A401-1997

Standard Form of Agreement Between Contractor and Subcontractor

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document has been approved and endorsed by the American Subcontractors Association and the Associated Specialty Contractors, Inc.

AGREEMENT made as of the day of
in the year
(In words, indicate day, month and year)

BETWEEN the Contractor:
(Name, address and other information)

and the Subcontractor:
(Name, address and other information)

The Contractor has made a contract for construction dated

With the Owner:
(Name, address and other information)

For the following Project:
(Include detailed description of Project, location and address)

which Contract is hereinafter referred to as the Prime Contract and which provides for the furnishing of labor, materials, equipment and services in connection with the construction of the Project. A copy of the Prime Contract, consisting of the Agreement Between Owner and Contractor (from which compensation amounts may be deleted) and the other Contract Documents enumerated therein has been made available to the Subcontractor.

The Architect for the Project is:
(Name, address and other information)

The Contractor and the Subcontractor agree as follows

ARTICLE 1 THE SUBCONTRACT DOCUMENTS

1.1 The Subcontract Documents consist of (1) this Agreement; (2) the Prime Contract, consisting of the Agreement between the Owner and Contractor and the other Contract Documents enumerated therein; (3) Modifications issued subsequent to the execution of the Agreement between the Owner and Contractor, whether before or after the execution of this Agreement; (4) other documents listed in Article 16 of this Agreement; and (5) Modifications to this Subcontract issued after execution of this Agreement. These form the Subcontract, and are as fully a part of the Subcontract as if attached to this Agreement or repeated herein. The Subcontract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Subcontract Documents, other than Modifications issued subsequent to the execution of this Agreement, appears in Article 16.

1.2 Except to the extent of a conflict with a specific term or condition contained in the Subcontract Documents, the General Conditions governing this Subcontract shall be the edition of AIA Document A201, General Conditions of the Contract for Construction, current as of the date of this Agreement.

1.3 The Subcontract may be amended or modified only by a Modification. The Subcontract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and the Subcontractor, (2) between the Owner and the Subcontractor, or (3) between any persons or entities other than the Contractor and Subcontractor.

1.4 The Subcontractor shall be furnished copies of the Subcontract Documents upon request, but the Contractor may charge the Subcontractor for the reasonable cost of reproduction.

ARTICLE 2 MUTUAL RIGHTS AND RESPONSIBILITIES

2.1 The Contractor and Subcontractor shall be mutually bound by the terms of this Agreement and, to the extent that the provisions of the edition of AIA Document A201 current as of the date of this Agreement apply to this Agreement pursuant to Paragraph 1.2 and provisions of the Prime Contract apply to the Work of the Subcontractor, the Contractor shall assume toward the Subcontractor all obligations and responsibilities that the Owner, under such documents, assumes toward the Contractor, and the Subcontractor shall assume toward the Contractor all obligations and responsibilities which the Contractor, under such documents, assumes toward the Owner and the Architect. The Contractor shall have the benefit of all rights, remedies and redress against the Subcontractor which the Owner, under such documents, has against the Contractor, and the Subcontractor shall have the benefit of all rights, remedies and redress against the Contractor which the Contractor, under such documents, has against the Owner, insofar as applicable to this Subcontract. Where a provision of such documents is inconsistent with a provision of this Agreement, this Agreement shall govern.

2.2 The Contractor may require the Subcontractor to enter into agreements with Sub-subcontractors performing portions of the Work of this Subcontract by which the Subcontractor and the Sub-subcontractor are mutually bound, to the extent of the Work to be performed by the Sub-subcontractor, assuming toward each other all obligations and responsibilities which the Contractor and Subcontractor assume toward each other and having the benefit of all rights, remedies and redress each against the other which the Contractor and Subcontractor have by virtue of the provisions of this Agreement.

ARTICLE 3 CONTRACTOR

3.1 SERVICES PROVIDED BY THE CONTRACTOR

3.1.1 The Contractor shall cooperate with the Subcontractor in scheduling and performing the Contractor's Work to avoid conflicts or interference in the Subcontractor's Work and shall expedite written responses to submittals made by the Subcontractor in accordance with Paragraph 4.1 and Article 5. As soon as practicable after execution of this Agreement, the Contractor shall provide the Subcontractor copies of the Contractor's construction schedule and schedule of submittals, together with such additional scheduling details as will enable the Subcontractor to plan and perform the Subcontractor's Work properly. The Subcontractor shall be notified promptly of subsequent changes in the construction and submittal schedules and additional scheduling details.

3.1.2 The Contractor shall provide suitable areas for storage of the Subcontractor's materials and equipment during the course of the Work. Additional costs to the Subcontractor resulting from relocation of such facilities at the direction of the Contractor, except as previously agreed upon, shall be reimbursed by the Contractor.

3.1.3 Except as provided in Article 14, the Contractor's equipment will be available to the Subcontractor only at the Contractor's discretion and on mutually satisfactory terms.

3.2 COMMUNICATIONS

3.2.1 The Contractor shall promptly make available to the Subcontractor information, including information received from the Owner, which affects this Subcontract and which becomes available to the Contractor subsequent to execution of this Subcontract.

3.2.2 The Contractor shall not give instructions or orders directly to the Subcontractor's employees or to the Subcontractor's Sub-subcontractors or material suppliers unless such persons are designated as authorized representatives of the Subcontractor.

3.2.3 The Contractor shall permit the Subcontractor to request directly from the Architect information regarding the percentages of completion and the amount certified on account of Work done by the Subcontractor.

3.2.4 If hazardous substances of a type of which an employer is required by law to notify its employees are being used on the site by the Contractor, a subcontractor or anyone directly or indirectly employed by them (other than the Subcontractor), the Contractor shall, prior to harmful exposure of the Subcontractor's employees to such substance, give written notice of the chemical composition thereof to the Subcontractor in sufficient detail and time to permit the Subcontractor's compliance with such laws.

3.2.5 The Contractor shall furnish to the Subcontractor within 30 days after receipt of a written request, or earlier if so required by law, information necessary and relevant for the Subcontractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property, usually referred to as the site, on which the Project is located and the Owner's interest therein.

3.2.6 If the Contractor asserts or defends a claim against the Owner which relates to the Work of the Subcontractor, the Contractor shall make available to the Subcontractor information relating to that portion of the claim which relates to the Work of the Subcontractor.

3.3 CLAIMS BY THE CONTRACTOR

3.3.1 Liquidated damages for delay, if provided for in Paragraph 9.3 of this Agreement, shall be assessed against the Subcontractor only to the extent caused by the Subcontractor or any person or entity for whose acts the Subcontractor may be liable, and in no case for delays or causes arising outside the scope of this Subcontract.

3.3.2 The Contractor's claims for services or materials provided the Subcontractor shall require:

.1 seven days' prior written notice except in an emergency;

.2 written compilations to the Subcontractor of services and materials provided and charges for such services and materials no later than the fifteenth day of the following month.

3.4 CONTRACTOR'S REMEDIES

3.4.1 If the Subcontractor defaults or neglects to carry out the Work in accordance with this Agreement and fails within three working days after receipt of written notice from the Contractor to commence and continue correction of such default or neglect with diligence and promptness, the Contractor may, after three days following receipt by the Subcontractor of an additional written notice, and without prejudice to any other remedy the Contractor may have, make good such deficiencies and may deduct the reasonable cost thereof from the payments then or thereafter due the Subcontractor.

ARTICLE 4 SUBCONTRACTOR

4.1 EXECUTION AND PROGRESS OF THE WORK

4.1.1 The Subcontractor shall supervise and direct the Subcontractor's Work, and shall cooperate with the Contractor in scheduling and performing the Subcontractor's Work to avoid conflict, delay in or interference with the Work of the Contractor, other subcontractors or Owner's own forces.

4.1.2 The Subcontractor shall promptly submit Shop Drawings, Product Data, Samples and similar submittals required by the Subcontract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Contractor or other subcontractors.

4.1.3 The Subcontractor shall submit to the Contractor a schedule of values allocated to the various parts of the Work of this Subcontract, aggregating the Subcontract Sum, made out in such detail as the Contractor and Subcontractor may agree upon or as required by the Owner, and supported by such evidence as the Contractor may require. In applying for payment, the Subcontractor shall submit statements based upon this schedule.

4.1.4 The Subcontractor shall furnish to the Contractor periodic progress reports on the Work of this Subcontract as mutually agreed, including information on the status of materials and equipment which may be in the course of preparation, manufacture or transit.

4.1.5 The Subcontractor agrees that the Contractor and the Architect will each have the authority to reject Work of the Subcontractor which does not conform to the Prime Contract. The Architect's decisions on matters relating to aesthetic effect shall be final and binding on the Subcontractor if consistent with the intent expressed in the Prime Contract.

4.1.6 The Subcontractor shall pay for all materials, equipment and labor used in connection with the performance of this Subcontract through the period covered by previous payments received from the Contractor, and shall furnish satisfactory evidence, when requested by the Contractor, to verify compliance with the above requirements.

4.1.7 The Subcontractor shall take necessary precautions to protect properly the Work of other subcontractors from damage caused by operations under this Subcontract.

4.1.8 The Subcontractor shall cooperate with the Contractor, other subcontractors and the Owner's own forces whose Work might interfere with the Subcontractor's Work. The

Subcontractor shall participate in the preparation of coordinated drawings in areas of congestion, if required by the Prime Contract, specifically noting and advising the Contractor of potential conflicts between the Work of the Subcontractor and that of the Contractor, other subcontractors or the Owner's own forces.

4.2 LAWS, PERMITS, FEES AND NOTICES

4.2.1 The Subcontractor shall give notices and comply with laws, ordinances, rules, regulations and orders of public authorities bearing on performance of the Work of this Subcontract. The Subcontractor shall secure and pay for permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Subcontractor's Work, the furnishing of which is required of the Contractor by the Prime Contract.

4.2.2 The Subcontractor shall comply with Federal, state and local tax laws, social security acts, unemployment compensation acts and workers' compensation acts insofar as applicable to the performance of this Subcontract.

4.3 SAFETY PRECAUTIONS AND PROCEDURES

4.3.1 The Subcontractor shall take reasonable safety precautions with respect to performance of this Subcontract, shall comply with safety measures initiated by the Contractor and with applicable laws, ordinances, rules, regulations and orders of public authorities for the safety of persons and property in accordance with the requirements of the Prime Contract. The Subcontractor shall report to the Contractor within three days an injury to an employee or agent of the Subcontractor which occurred at the site.

4.3.2 If hazardous substances of a type of which an employer is required by law to notify its employees are being used on the site by the Subcontractor, the Subcontractor's Sub-subcontractors or anyone directly or indirectly employed by them, the Subcontractor shall, prior to harmful exposure of any employees on the site to such substance, give written notice of the chemical composition thereof to the Contractor in sufficient detail and time to permit compliance with such laws by the Contractor, other subcontractors and other employers on the site.

4.3.3 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Subcontractor, the Subcontractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Contractor in writing. When the material or substance has been rendered harmless, the Subcontractor's Work in the affected area shall resume upon written agreement of the Contractor and Subcontractor. The Subcontract Time shall be extended appropriately and the Subcontract Sum shall be increased in the amount of the Subcontractor's reasonable additional costs of demobilization, delay and remobilization, which adjustments shall be accomplished as provided in Article 5 of this Agreement.

4.3.4 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Subcontractor, the Subcontractor's Sub-subcontractors, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Subparagraph 4.3.3 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

4.4 CLEANING UP

4.4.1 The Subcontractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations performed under this Subcontract. The Subcontractor shall not be held responsible for unclean conditions caused by other contractors or subcontractors.

4.4.2 As provided under Subparagraph 3.3.2, if the Subcontractor fails to clean up as provided in the Subcontract Documents, the Contractor may charge the Subcontractor for the Subcontractor's appropriate share of cleanup costs.

4.5 WARRANTY

4.5.1 The Subcontractor warrants to the Owner, Architect and Contractor that materials and equipment furnished under this Subcontract will be of good quality and new unless otherwise required or permitted by the Subcontract Documents, that the Work of this Subcontract will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Subcontract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Subcontractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Subcontractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. This warranty shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Subcontract Documents.

4.6 INDEMNIFICATION

4.6.1 To the fullest extent permitted by law, the Subcontractor shall indemnify and hold harmless the Owner, Contractor, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Subcontractor's Work under this Subcontract, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Subcontractor, the Subcontractor's Sub-subcontractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 4.6.

4.6.2 In claims against any person or entity indemnified under this Paragraph 4.6 by an employee of the Subcontractor, the Subcontractor's Sub-subcontractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph 4.6.1 shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the Subcontractor or the Subcontractor's Sub-subcontractors under workers' compensation acts, disability benefit acts or other employee benefit acts.

4.7 REMEDIES FOR NONPAYMENT

4.7.1 If the Contractor does not pay the Subcontractor through no fault of the Subcontractor, within seven days from the time payment should be made as provided in this Agreement, the Subcontractor may, without prejudice to any other available remedies, upon seven additional days' written notice to the Contractor, stop the Work of this Subcontract until payment of the amount owing has been received. The Subcontract Sum shall, by appropriate adjustment, be increased by the amount of the Subcontractor's reasonable costs of demobilization, delay and remobilization.

ARTICLE 5 CHANGES IN THE WORK

5.1 The Owner may make changes in the Work by issuing Modifications to the Prime Contract. Upon receipt of such a Modification issued subsequent to the execution of the Subcontract Agreement, the Contractor shall promptly notify the Subcontractor of the Modification. Unless otherwise directed by the Contractor, the Subcontractor shall not thereafter order materials or perform Work which would be inconsistent with the changes made by the Modifications to the Prime Contract.

5.2 The Subcontractor may be ordered in writing by the Contractor, without invalidating this Subcontract, to make changes in the Work within the general scope of this Subcontract consisting of additions, deletions or other revisions, including those required by Modifications to the Prime Contract issued subsequent to the execution of this Agreement, the Subcontract Sum and the Subcontract Time being adjusted accordingly. The Subcontractor, prior to the commencement of such changed or revised Work, shall submit promptly to the Contractor written copies of a claim for adjustment to the Subcontract Sum and Subcontract Time for such revised Work in a manner consistent with requirements of the Subcontract Documents.

5.3 The Subcontractor shall make all claims promptly to the Contractor for additional cost, extensions of time and damages for delays or other causes in accordance with the Subcontract Documents. A claim which will affect or become part of a claim which the Contractor is required to make under the Prime Contract within a specified time period or in a specified manner shall be made in sufficient time to permit the Contractor to satisfy the requirements of the Prime Contract. Such claims shall be received by the Contractor not less than two working days preceding the time by which the Contractor's claim must be made. Failure of the Subcontractor to make such a timely claim shall bind the Subcontractor to the same consequences as those to which the Contractor is bound.

ARTICLE 6 MEDIATION AND ARBITRATION

6.1 MEDIATION

6.1.1 Any claim arising out of or related to this Subcontract, except claims as otherwise provided in Subparagraph 4.1.5 and except those waived in this Subcontract, shall be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

6.1.2 The parties shall endeavor to resolve their claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to this Subcontract and the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

6.1.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

6.2 ARBITRATION

6.2.1 Any claim arising out of or related to this Subcontract, except claims as otherwise provided in Subparagraph 4.1.5 and except those waived in this Subcontract, shall be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 6.1.

6.2.2 Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. Demand for arbitration shall be filed in writing with the other party to this Subcontract and with the American Arbitration Association, and a copy shall be filed with the Architect.

6.2.3 A demand for arbitration shall be made within the time limits specified in the conditions of the Prime Contract as applicable, and in other cases within a reasonable time after the claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim would be barred by the applicable statute of limitations.

6.2.4 Limitation on Consolidation or Joinder. Except by written consent of the person or entity sought to be joined, no arbitration arising out of or relating to the Subcontract shall include, by consolidation or joinder or in any other manner, any person or entity not a party to the Subcontract under which such arbitration arises, unless it is shown at the time the demand for arbitration is filed that (1) such person or entity is substantially involved in a common question of fact or law, (2) the presence of such person or entity is required if complete relief is to be accorded in the arbitration, (3) the interest or responsibility of such person or entity in the matter is not insubstantial, and (4) such person or entity is not the Architect, the Architect's employee, the Architect's consultant, or an employee or agent of any of them. This agreement to arbitrate and any other written agreement to arbitrate with an additional person or persons referred to herein shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

6.2.5 Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all claims then known to that party on which arbitration is permitted to be demanded.

6.2.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 7 TERMINATION, SUSPENSION OR ASSIGNMENT OF THE SUBCONTRACT

7.1 TERMINATION BY THE SUBCONTRACTOR

7.1.1 The Subcontractor may terminate the Subcontract for the same reasons and under the same circumstances and procedures with respect to the Contractor as the Contractor may terminate with respect to the Owner under the Prime Contract, or for nonpayment of amounts due under this Subcontract for 60 days or longer. In the event of such termination by the Subcontractor for any reason which is not the fault of the Subcontractor, Sub-subcontractors or their agents or employees or other persons performing portions of the Work under contract with the Subcontractor, the Subcontractor shall be entitled to recover from the Contractor payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

7.2 TERMINATION BY THE CONTRACTOR

7.2.1 If the Subcontractor persistently or repeatedly fails or neglects to carry out the Work in accordance with the Subcontract Documents or otherwise to perform in accordance with this Subcontract and fails within seven days after receipt of written notice to commence and continue correction of such default or neglect with diligence and promptness, the Contractor may, after seven days following receipt by the Subcontractor of an additional written notice and without prejudice to any other remedy the Contractor may have, terminate the Subcontract and finish the Subcontractor's Work by whatever method the Contractor may deem expedient. If the

unpaid balance of the Subcontract Sum exceeds the expense of finishing the Subcontractor's Work and other damages incurred by the Contractor and not expressly waived, such excess shall be paid to the Subcontractor. If such expense and damages exceed such unpaid balance, the Subcontractor shall pay the difference to the Contractor.

7.2.2 If the Owner terminates the Contract for the Owner's convenience, the Contractor shall deliver written notice to the Subcontractor.

7.2.3 Upon receipt of written notice of termination, the Subcontractor shall:

.1 cease operations as directed by the Contractor in the notice;

.2 take actions necessary, or that the Contractor may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Sub-subcontracts and purchase orders and enter into no further Sub-subcontracts and purchase orders.

7.2.4 In case of such termination for the Owner's convenience, the Subcontractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

7.3 SUSPENSION BY THE CONTRACTOR FOR CONVENIENCE

7.3.1 The Contractor may, without cause, order the Subcontractor in writing to suspend, delay or interrupt the Work of this Subcontract in whole or in part for such period of time as the Contractor may determine. In the event of suspension ordered by the Contractor, the Subcontractor shall be entitled to an equitable adjustment of the Subcontract Time and Subcontract Sum.

7.3.2 An adjustment shall be made for increases in the Subcontract Time and Subcontract Sum, including profit on the increased cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Subcontractor is responsible;

.2 that an equitable adjustment is made or denied under another provision of this Subcontract.

7.4 ASSIGNMENT OF THE SUBCONTRACT

7.4.1 In the event of termination of the Prime Contract by the Owner, the Contractor may assign this Subcontract to the Owner, with the Owner's agreement, subject to the provisions of the Prime Contract and to the prior rights of the surety, if any, obligated under bonds relating to the Prime Contract. In such event, the Owner shall assume the Contractor's rights and obligations under the Subcontract Documents. If the Work of the Prime Contract has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted.

7.4.2 The Subcontractor shall not assign the Work of this Subcontract without the written consent of the Contractor, nor subcontract the whole of this Subcontract without the written consent of the Contractor, nor further subcontract portions of this Subcontract without written notification to the Contractor when such notification is requested by the Contractor.

ARTICLE 8 THE WORK OF THIS SUBCONTRACT

8.1 The Subcontractor shall execute the following portion of the Work described in the Subcontract Documents, including all labor, materials, equipment, services and other items required to complete such portion of the Work, except to the extent specifically indicated in the Subcontract Documents to be the responsibility of others.

(Insert a precise description of the Work of this Subcontract, referring where appropriate to numbers of Drawings, sections of Specifications and pages of Addenda, Modifications and accepted Alternates.)

ARTICLE 9 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

9.1 The Subcontractor's date of commencement is the date from which the Contract Time of Paragraph 9.3 is measured; it shall be the date of this Agreement, as first written above, unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Contractor.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

9.2 Unless the date of commencement is established by a notice to proceed issued by the Contractor, or the Contractor has commenced visible Work at the site under the Prime Contract, the Subcontractor shall notify the Contractor in writing not less than five days before commencing the Subcontractor's Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

9.3 The Work of this Subcontract shall be substantially completed not later than

(Insert the calendar date or number of calendar days after the Subcontractor's date of commencement. Also insert any requirements for earlier Substantial Completion of certain portions of the Subcontractor's Work, if not stated elsewhere in the Subcontract Documents.)

, subject to adjustments of this Subcontract Time as provided in the Subcontract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to complete on time.)

9.4 With respect to the obligations of both the Contractor and the Subcontractor, time is of the essence of this Subcontract.

9.5 No extension of time will be valid without the Contractor's written consent after claim made by the Subcontractor in accordance with Paragraph 5.3.

ARTICLE 10 SUBCONTRACT SUM

10.1 The Contractor shall pay the Subcontractor in current funds for performance of the Subcontract the Subcontract Sum of
Dollars ($), subject to additions and deductions as provided in the Subcontract Documents.

10.2 The Subcontract Sum is based upon the following alternates, if any, which are described in the Subcontract Documents and have been accepted by the Owner and the Contractor:
(Insert the numbers or other identification of accepted alternates.)

10.3 Unit prices, if any, are as follows:

ARTICLE 11 PROGRESS PAYMENTS

11.1 Based upon applications for payment submitted to the Contractor by the Subcontractor, corresponding to applications for payment submitted by the Contractor to the Architect, and certificates for payment issued by the Architect, the Contractor shall make progress payments on account of the Subcontract Sum to the Subcontractor as provided below and elsewhere in the Subcontract Documents. Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor and Subcontractor for Work properly performed by their contractors and suppliers shall be held by the Contractor and Subcontractor for those contractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor or Subcontractor for which payment was made to the Contractor by the Owner or to the Subcontractor by the Contractor, as applicable. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor or Subcontractor, shall create any fiduciary liability or tort liability on the part of the Contractor or Subcontractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor or Subcontractor for breach of the requirements of this provision.

11.2 The period covered by each application for payment shall be one calendar month ending on the last day of the month, or as follows:

11.3 Provided an application for payment is received by the Contractor not later than the day of a month, the Contractor shall include the Subcontractor's Work covered by that application in the next application for payment which the Contractor is entitled to submit to the Architect. The Contractor shall pay the Subcontractor each progress payment within three working days after the Contractor receives payment from the Owner. If the Architect does not issue a certificate for payment or the Contractor does not receive payment for any cause which is not the fault of the Subcontractor, the Contractor shall pay the Subcontractor, on demand, a progress payment computed as provided in Paragraphs 11.7, 11.8 and 11.9.

11.4 If an application for payment is received by the Contractor after the application date fixed above, the Subcontractor's Work covered by it shall be included by the Contractor in the next application for payment submitted to the Architect.

11.5 Each application for payment shall be based upon the most recent schedule of values submitted by the Subcontractor in accordance with the Subcontract Documents. The schedule of values shall allocate the entire Subcontract Sum among the various portions of the Subcontractor's Work and be prepared in such form and supported by such data to substantiate its accuracy as the Contractor may require. This schedule, unless objected to by the Contractor, shall be used as a basis for reviewing the Subcontractor's applications for payment.

11.6 Applications for payment submitted by the Subcontractor shall indicate the percentage of completion of each portion of the Subcontractor's Work as of the end of the period covered by the application for payment.

11.7 Subject to the provisions of the Subcontract Documents, the amount of each progress payment shall be computed as follows:

11.7.1 Take that portion of the Subcontract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Subcontractor's Work by the share of the total Subcontract Sum allocated to that portion of the Subcontractor's Work in the schedule of values, less that percentage actually retained, if any, from payments to the Contractor on account of the Work of the Subcontractor. Pending final determination of cost to the Contractor of changes in the Work which have been properly authorized by the Contractor, amounts not in dispute shall be included to the same extent provided in the Prime Contract, even though the Subcontract Sum has not yet been adjusted;

11.7.2 Add that portion of the Subcontract Sum properly allocable to materials and equipment delivered and suitably stored at the site by the Subcontractor for subsequent incorporation in the Subcontractor's Work or, if approved by the Contractor, suitably stored off the site at a location agreed upon in writing, less the same percentage retainage required by the Prime Contract to be applied to such materials and equipment in the Contractor's application for payment;

11.7.3 Subtract the aggregate of previous payments made by the Contractor; and

11.7.4 Subtract amounts, if any, calculated under Subparagraph 11.7.1 or 11.7.2 which are related to Work of the Subcontractor for which the Architect has withheld or nullified, in whole or in part, a certificate of payment for a cause which is the fault of the Subcontractor.

11.8 Upon the partial or entire disapproval by the Contractor of the Subcontractor's application for payment, the Contractor shall provide written notice to the Subcontractor. When the basis for the disapproval has been remedied, the Subcontractor shall be paid the amounts withheld.

11.9 SUBSTANTIAL COMPLETION

11.9.1 When the Subcontractor's Work or a designated portion thereof is substantially complete and in accordance with the requirements of the Prime Contract, the Contractor shall, upon application by the Subcontractor, make prompt application for payment for such Work. Within 30 days following issuance by the Architect of the certificate for payment covering such substantially completed Work, the Contractor shall, to the full extent allowed in the Prime Contract, make payment to the Subcontractor, deducting any portion of the funds for the Subcontractor's Work withheld in accordance with the certificate to cover costs of items to be completed or corrected by the Subcontractor. Such payment to the Subcontractor shall be the entire unpaid balance of the Subcontract Sum if a full release of retainage is allowed under the

Prime Contract for the Subcontractor's Work prior to the completion of the entire Project. If the Prime Contract does not allow for a full release of retainage, then such payment shall be an amount which, when added to previous payments to the Subcontractor, will reduce the retainage on the Subcontractor's substantially completed Work to the same percentage of retainage as that on the Contractor's Work covered by the certificate.

ARTICLE 12 FINAL PAYMENT

12.1 Final payment, constituting the entire unpaid balance of the Subcontract Sum, shall be made by the Contractor to the Subcontractor when the Subcontractor's Work is fully performed in accordance with the requirements of the Subcontract Documents, the Architect has issued a certificate for payment covering the Subcontractor's completed Work and the Contractor has received payment from the Owner. If, for any cause which is not the fault of the Subcontractor, a certificate for payment is not issued or the Contractor does not receive timely payment or does not pay the Subcontractor within three working days after receipt of payment from the Owner, final payment to the Subcontractor shall be made upon demand.
(Insert provisions for earlier final payment to the Subcontractor, if applicable.)

12.2 Before issuance of the final payment, the Subcontractor, if required, shall submit evidence satisfactory to the Contractor that all payrolls, bills for materials and equipment, and all known indebtedness connected with the Subcontractor's Work have been satisfied.

ARTICLE 13 INSURANCE AND BONDS

13.1 The Subcontractor shall purchase and maintain insurance of the following types of coverage and limits of liability:

13.2 Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Subcontractor's Work until date of final payment and termination of any coverage required to be maintained after final payment to the Subcontractor.

13.3 Certificates of insurance acceptable to the Contractor shall be filed with the Contractor prior to commencement of the Subcontractor's Work. These certificates and the insurance policies required by this Article 13 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for payment as required in Article 12. If any information concerning reduction of coverage is not furnished by the insurer, it shall be furnished by the Subcontractor with reasonable promptness according to the Subcontractor's information and belief.

13.4 The Contractor shall furnish to the Subcontractor satisfactory evidence of insurance required of the Contractor under the Prime Contract.

13.5 The Contractor shall promptly, upon request of the Subcontractor, furnish a copy or permit a copy to be made of any bond covering payment of obligations arising under the Subcontract.

13.6 Performance Bond and Payment Bond:
(If the Subcontractor is to furnish bonds, insert the specific requirements here.)

13.7 PROPERTY INSURANCE

13.7.1 When requested in writing, the Contractor shall provide the Subcontractor with copies of the property and equipment policies in effect for the Project. The Contractor shall notify the Subcontractor if the required property insurance policies are not in effect.

13.7.2 If the required property insurance is not in effect for the full value of the Subcontractor's Work, then the Subcontractor shall purchase insurance for the value of the Subcontractor's Work, and the Subcontractor shall be reimbursed for the cost of the insurance by an adjustment in the Subcontract Sum.

13.7.3 Property insurance for the Subcontractor's materials and equipment required for the Subcontractor's Work, stored off site or in transit and not covered by the Project property insurance, shall be paid for through the application for payment process.

13.8 WAIVERS OF SUBROGATION

13.8.1 The Contractor and Subcontractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Owner, the Architect, the Architect's consultants, separate contractors, and any of their subcontractors, sub-subcontractors, agents and employees for damages caused by fire or other causes of loss to the extent covered by property insurance provided under the Prime Contract or other property insurance applicable to the Work, except such rights as they may have to proceeds of such insurance held by the Owner as a fiduciary. The Subcontractor shall require of the Subcontractor's Sub-subcontractors, agents and employees, by appropriate agreements, written where legally required for validity, similar waivers in favor of the parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

ARTICLE 14 TEMPORARY FACILITIES AND WORKING CONDITIONS

14.1 The Contractor shall furnish and make available to the Subcontractor the following temporary facilities, equipment and services; these shall be furnished at no cost to the Subcontractor unless otherwise indicated below:

14.2 Specific working conditions:
(Insert any applicable arrangements concerning working conditions and labor matters for the Project.)

ARTICLE 15 MISCELLANEOUS PROVISIONS

15.1 Where reference is made in this Subcontract to a provision of another Subcontract Document, the reference refers to that provision as amended or supplemented by other provisions of the Subcontract Documents.

15.2 Payments due and unpaid under this Subcontract shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's, Contractor's and Subcontractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)

15.3 Retainage and any reduction thereto is as follows:

15.4 The Contractor and Subcontractor waive claims against each other for consequential damages arising out of or relating to this Subcontract, including without limitation, any consequential damages due to either party's termination in accordance with Article 7.

ARTICLE 16 ENUMERATION OF SUBCONTRACT DOCUMENTS

16.1 The Subcontract Documents, except for Modifications issued after execution of this Subcontract, are enumerated as follows:

16.1.1 This executed 1997 edition of the Standard Form of Agreement Between Contractor and Subcontractor, AIA Document A401-1997;

16.1.2 The Prime Contract, consisting of the Agreement between the Owner and Contractor dated as first entered above and the other Contract Documents enumerated in the Owner-Contractor Agreement;

16.1.3 The following Modifications to the Prime Contract, if any, issued subsequent to the execution of the Owner-Contractor Agreement but prior to the execution of this Agreement:

Modification	Date

16.1.4 Other Documents, if any, forming part of the Subcontract Documents are as follows:
(List any additional documents that are intended to form part of the Subcontract Documents. Requests for proposal and the Subcontractor's bid or proposal should be listed here only if intended to be part of the Subcontract Documents.)

This Agreement entered into as of the day and year first written above.

CONTRACTOR *(Signature)*	**SUBCONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

The American Institute of Architects
1735 New York Avenue, Washington, D.C. 2000

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interpretation given to a standard clause when blended with modifications, thereby eliminating one of the principal advantages of the standard form documents. By merely reviewing the modifications to be made to a standard form document, parties familiar with that document can quickly understand the essence of the proposed relationship. Commercial exchanges are greatly simplified and expedited, good-faith dealing is encouraged, and otherwise latent clauses are exposed for scrutiny. In this way, contracting parties can more confidently and fairly measure their risks.

COVER PAGE

Date: The date represents the date the Agreement becomes effective. It may be the date that an oral agreement was reached, the date the Agreement was originally submitted to the other party, the date authorizing action was taken or the date of actual execution. It will be the date from which the Contract Time is measured unless a different date is inserted under Paragraph 9.1.

Parties: Parties to this Agreement should be identified using the full legal name under which the Agreement is to be executed, including a designation of the legal status of both parties (sole proprietorship, partnership, joint venture, unincorporated association, limited partnership or corporation [general, limited liability, closed or professional], etc.). Where appropriate, a copy of the resolution authorizing the individual to act on behalf of the firm or entity should be attached. Other information may be added, such as telephone numbers and electronic addresses.

Prime Contract: The date of the Agreement between the Owner and Contractor should be entered.

Owner: The name and address of the Owner should be the same as used on the Prime Contract.

Project Description: The proposed Project should be described in sufficient detail to identify (1) the official name or title of the facility, (2) the location of the site, if known, (3) the proposed building type and usage, and (4) the size, capacity or scope of the Project, if known.

Architect: As in the other Contract Documents, the Architect's full legal or corporate titles should be used.

ARTICLE 8—THE WORK OF THIS SUBCONTRACT

Insert a precise description of the Work of this Subcontract.

ARTICLE 9—DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

The following items should be included as appropriate:

PARAGRAPH 9.1 The date of commencement of the Work should be inserted if it is different from the date of the Agreement. It should not be earlier than the date of execution of the Agreement. Enter either the specific date of commencement of the Work, or if a notice to proceed is to be used, enter the sentence, "The date of commencement shall be stipulated by the notice to proceed."

PARAGRAPH 9.3 The time within which Substantial Completion of the Work is to be achieved may be expressed as a number of days (preferably calendar days) or as a specified date. Any requirements for earlier Substantial Completion of portions of the Work should be entered here if not specified elsewhere in the Contract Documents.

Also insert any provisions for liquidated damages relating to failure to complete on time. Liquidated damages are not a penalty to be inflicted on the Subcontractor, but must bear an actual and reasonably estimable relationship to the Contractor's loss if construction is not completed on time. If liquidated damages are to be assessed because delayed construction will result in actual loss to the Contractor, the amount of damages due for each day lost should be entered in the Agreement.

If a provision for liquidated damages is included, it should be carefully drafted by an attorney. Such a provision may be based on the following sample language.

"The Subcontractor and the Subcontractor's surety, if any, shall be liable for and shall pay the Contractor the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the Work is substantially complete: Dollars($)."

For further information on liquidated damages, penalties and bonus provisions, see AIA Document A511, Guide to Supplementary Conditions.

ARTICLE 10—SUBCONTRACT SUM

PARAGRAPH 10.1 Enter the Subcontract Sum payable to the Subcontractor.

PARAGRAPH 10.2 Identify any alternates described in the Subcontract Documents and accepted by the Owner and the Contractor. If decisions on alternates are to be made subsequent to execution of A401-1997, attach a schedule showing the amount of each alternate and the date it expires.

PARAGRAPH 10.3 Enter any unit prices, cash allowances or cash contingency allowances.

If unit prices are not covered in greater detail elsewhere in the Subcontract Documents, the following provision for unit prices is suggested:

"The unit prices listed below shall determine the value of extra Work or changes in the Work, as applicable. They shall be considered complete and shall include all material and equipment, labor, installation costs, overhead and profit. Unit prices shall be used uniformly for additions or deductions."

ARTICLE 11—PROGRESS PAYMENTS

PARAGRAPH 11.2 Insert the time period covered by each application for payment if it differs from the one given.

PARAGRAPH 11.3 Insert the time schedule for presenting applications for payment.

The last day upon which Work may be included in an application should normally be no less than 14 days prior to the payment date, in consideration of the 7 days required for the Architect's evaluation of the Contractor's application and issuance of a certificate for payment and the time subsequently accorded the Owner to make Payment in Article 9 of A201. The Contractor may prefer that the Subcontractor's applications be submitted a few additional days prior to the preparation of the Contractor's application.

Due dates for payment should be acceptable to both the Contractor and Subcontractor. They should allow sufficient time for the Contractor to prepare an Application for Payment, for the Architect to certify payment, and for the Owner to make payment. They should also be in accordance with the time limits established by this Article and Article 9 of A201.

ARTICLE 12—FINAL PAYMENT

Insert provisions for earlier final payment to the Subcontractor, if applicable. When final payment is requested, the Architect should ascertain that all claims have been settled or should define those which remain unsettled. The Architect should obtain the Contractor's certification required by Article 9 of A201 and must determine that, to the best of Architect's knowledge and belief and according to the Architect's final inspection, the requirements of the subcontract have been fulfilled. The Contractor may also require satisfactory evidence from the Subcontractor that all known indebtedness related to the Subcontractor's work has been paid.

ARTICLE 13—INSURANCE AND BONDS

PARAGRAPH 13.1 Insert types of coverage and limits of liability to be maintained by the Subcontractor.

PARAGRAPH 13.6 If the Subcontractor is to furnish a performance bond and a payment bond, insert specific requirements such as amounts, the date the bonds are required to be delivered and the forms on which the bonds are to be written. See AIA Document A312, Performance Bond and Payment Bond, which may be modified for a contractor-subcontractor relationship.

ARTICLE 14—TEMPORARY FACILITIES AND WORKING CONDITIONS

PARAGRAPH 14.1 List temporary facilities, equipment and services to be furnished by the Contractor to the Subcontractor. These are to be furnished free of charge unless otherwise indicated in this Paragraph.

PARAGRAPH 14.2 Insert any applicable arrangements concerning working conditions and labor for the Project.

ARTICLE 15—MISCELLANEOUS PROVISIONS

PARAGRAPH 15.2 Enter any agreed-upon interest rate due on overdue payments.

PARAGRAPH 15.3 Indicate the percent retainage, if any, to be withheld when computing the amount of each progress payment, as well as any provisions for reduction of retainage.

ARTICLE 16—ENUMERATION OF SUBCONTRACT DOCUMENTS

A detailed enumeration of all Subcontract Documents must be made in this Article.

EXECUTION OF THE AGREEMENT.

The persons executing the Agreement should indicate the capacity in which they are acting (i.e., president, secretary, partner, etc.) and the authority under which they are executing the Agreement. Where appropriate, a copy of the resolution authorizing the individual to act on behalf of the firm or entity should be attached.

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